



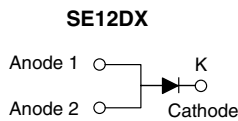
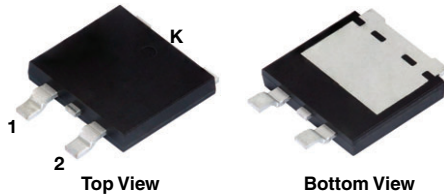
**THE DATASHEET OF  
SE12DDHM3/I**





## Surface-Mount ESD Capability Rectifiers

### eSMP<sup>®</sup> Series SMPD (TO-263AC)



### FEATURES

- Very low profile - typical height of 1.7 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop
- ESD capability
- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### TYPICAL APPLICATIONS

General purpose, power line polarity protection, in both consumer and automotive applications.

### ADDITIONAL RESOURCES



### MECHANICAL DATA

**Case:** SMPD (TO-263AC)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	12 A
$V_{RRM}$	100 V, 200 V, 400 V, 600 V
$I_{FSM}$	125 A
$V_F$ at $I_F = 12$ A ( $T_A = 125$ °C)	0.96 V
$I_R$	20 $\mu$ A
$T_J$ max.	175 °C
Package	SMPD (TO-263AC)
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)						
PARAMETER	SYMBOL	SE12DB	SE12DD	SE12DG	SE12DJ	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	200	400	600	V
Maximum DC forward current	$I_F^{(1)}$	12				A
	$I_F^{(2)}$	3.2				
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	125				A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175				°C

### Notes

(1) With heatsink

(2) Free air, mounted on recommended copper pad area



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 6\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.95	-	V
	$I_F = 12\text{ A}$			1.04	1.15	
	$I_F = 6\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.85	-	
	$I_F = 12\text{ A}$			0.96	1.10	
Reverse current	Rated $V_R$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	-	20	$\mu\text{A}$
		$T_A = 125\text{ }^\circ\text{C}$		27	150	
Typical reverse recovery time	$I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$		$t_{rr}$	3000	-	ns
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	90	-	pF

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ 

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	SYMBOL	SE12DB	SE12DD	SE12DG	SE12DJ	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	60				$^\circ\text{C/W}$
	$R_{\theta JC}^{(3)}$	1.6				

**Notes**(1) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ (2) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient

(3) With infinite heatsink

<b>IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	$C = 100\text{ pF}, R = 1.5\text{ k}\Omega$	$V_C$	H3B	$> 8\text{ kV}$

<b>ORDERING INFORMATION</b> (Example)					
STANDARD	PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SMPD (TO-263AC)	SE12DJ-M3/I	0.54	I	2000/reel	13" diameter plastic tape and reel
SMPD (TO-263AC)	SE12DJHM3/I <sup>(1)</sup>	0.54	I	2000/reel	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified



**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

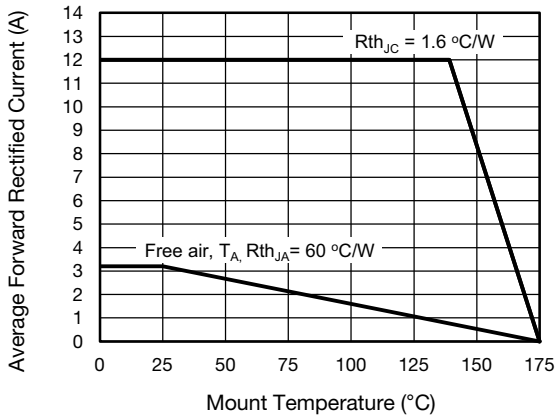


Fig. 1 - Forward Current Derating Curve

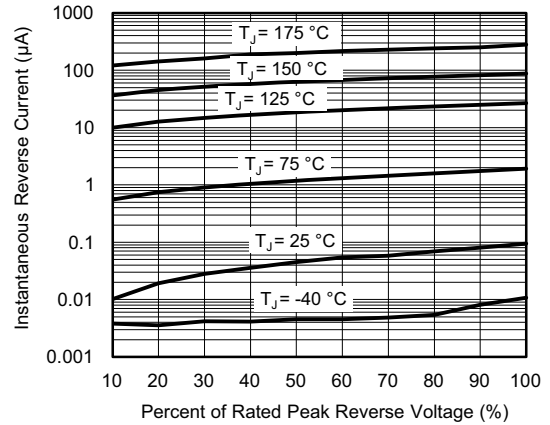


Fig. 4 - Typical Reverse Leakage Characteristics

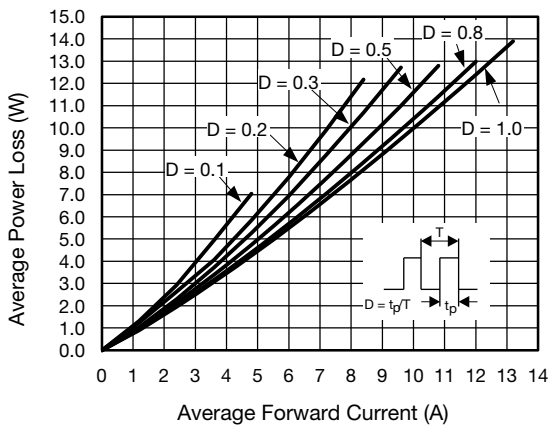


Fig. 2 - Forward Power Loss Characteristics

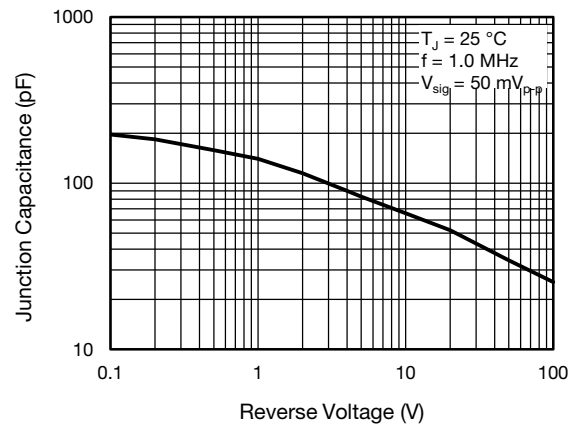


Fig. 5 - Typical Junction Capacitance

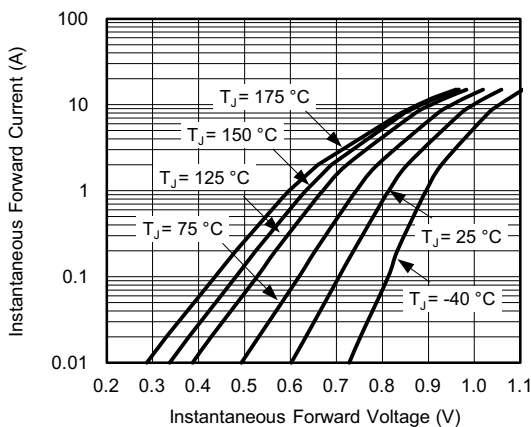


Fig. 3 - Typical Instantaneous Forward Characteristics

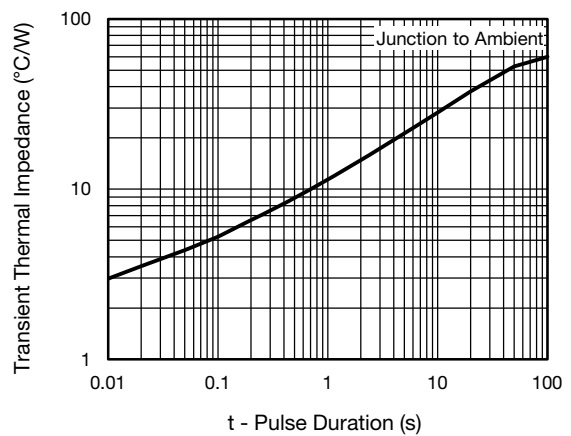
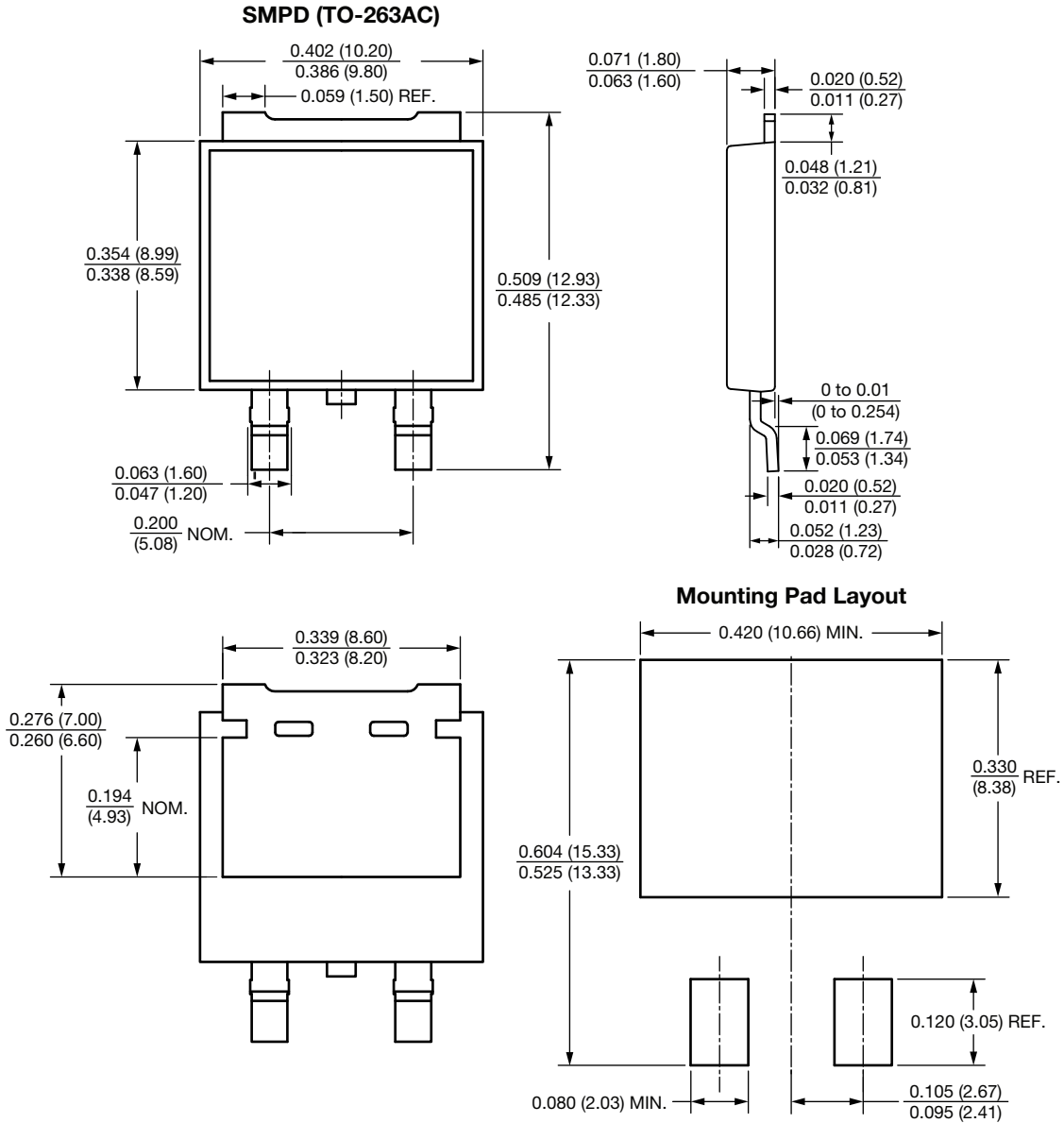


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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